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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,370	04/26/2001	Lujun Chen	S01.12-0730/STL9852	9242

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EXAMINER	
MILLER, BRIAN E	
ART UNIT	**PAPER NUMBER**
2652	9

DATE MAILED: 09/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/843,370	CHEN ET AL.	
	Examiner	Art Unit	
	Brian E. Miller	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-18* is/are pending in the application.

4a) Of the above claim(s) *18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-2, 4-18* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claims 1-18 are now pending.

Election/Restrictions

1. Applicant's election with traverse of Group I in Paper No. 8 is acknowledged. The traversal is on the ground(s) that the Examiner has provided no explanation as to what materially different process could be used to form the product. In response, for example, a different process would be to set one AFM layer (with a higher anneal temperature) first, then set a second AFM layer after the first, i.e., a two step process, not simultaneously as claimed. Therefore, new claim 18 will be withdrawn from further consideration.

The requirement is still deemed proper and is therefore made FINAL.

2. Claim 18 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 8.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claim 17 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in the paper filed 3/4/02. In that paper, applicant has set forth that the method of claim 17 includes the step of "setting bias fields of the first and second AFM layers simultaneously" and this statement

indicates that the invention is different from what is defined in the claim(s) because the independent claim now does not include this limitation.

5. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not readily apparent whether the "magnetic field sensing means" is part of the "sensor stack" or is a separate element. Clarification is necessary.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Kanai et al (US 5,898,546). Kanai et al discloses a spin valve sensor having a sensor stack including at least elements 21-30 (FIG. 5(a), (b)) adapted to receive a sense current, and a magnetic field sensing means including 24, 25, 26 for adjusting the electrical resistance of the sensor stack in response to an applied magnetic field.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-2, 4-9, 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanai et al. See also the description, supra. More specifically, as shown mainly in FIGs. 5 (a), 5(b), 5(c), and 6(a) & 6(b) Kanai et al further discloses MR sensor for use in a data storage system (re claims 8 & 16; see col. 1, lines 6-20) a sense current I which is horizontally orientated in a longitudinal direction; a first ferromagnetic free layer 26 (36) having a magnetization M1(M3) in a first direction in the longitudinal direction of the sense current (see FIG. 5(c)); a second ferromagnetic free layer 24 (34) having a magnetization in a second direction M2(M4), which is anti-parallel to the first direction; a spacer layer 25 (35) between the first and second ferromagnetic layers; a biasing member, e.g., permanent magnet layer 32 which produces a bias magnetic field (M5) that biases both M1(M3) and M2(M4) in a third direction that is transverse to the first and second directions, such that the magnetizations of the free layers rotate about their quiescent bias state to produce a GMR effect in the sensor as is known in the art (see also col. 12, line 60 thru col. 13, line 40; (re claims 7 & 15) the magnetizations are orientated in a direction that is about 45 degrees relative to the sense current (as shown in FIGs. 5(c) and 6(b)); (re claims 4 & 12) wherein Kanai et al shows that the third direction is upward (or downward) relative to the x-axis; (re claims 5 & 13) wherein Kanai et al discloses first and second contacts 27-28 (37-38) which allows current to flow in the longitudinal direction(s). While Kanai et al does show a permanent hard bias layer 32 on the bottom of the stack, it would have been obvious to one having ordinary skill at the time the invention was made, to have alternatively provided it on top of the first and second ferromagnetic free layers, i.e., reverse stacking of the layers, at least as suggested by Kanai et al (see col. 18, lines 9-14). The motivation would have been: lacking any

unobvious or unexpected results, reversing the lamination would have resulted through routine engineering optimization and/or experimentation, as suggested by Kanai et al and as known in the art. Furthermore, with respect to the biasing being top and bottom antiferromagnetic layers (re claims 9, 11 & 17), Official Notice is taken that such biasing by AF layers is notoriously old and well known, and substituting this biasing configuration for the permanent magnet biasing (for example) as taught in Kanai et al would have been obvious to and within the knowledge of a skilled artisan. The motivation would have been: lacking any unobvious or unexpected results, substituting between known biasing methods would have involved routine skill resulting through routine engineering optimization and experimentation.

Further, with respect to claims 6 & 14, and to top and bottom shields, Kanai et al further teaches (see col. 21, lines 19-55) such shields 101, 102 positioned appropriately in a read/write merged MR head, as is known in the art with uniform shield-to-shield spacing. It is understood that any of the MR sensor configurations would be utilized with this shielding configuration.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (703) 308-2850. The examiner can normally be reached on M-W from 7:30 am to 5:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Brian E. Miller
Primary Examiner
Art Unit 2652

bem
September 15, 2003